AN ALMANACK

For the Year of our LORD

1658.

Shewing the daily places of the Sun and Moon, their Conjunctions, Aspects and Eclipses, their Rising, Southing, and Setting, with the true time of the *TIDES.*

Calculated for the Meridian and Horizon of the Honorable City of LONDON, being situated in 51 *deg.* 32 *min.* of North Latitude, and 24 *deg.* 20 *min.* of Longitude.

Whereunto is added,

A brief Discourse of Astronomy, demonstrating by the Principles thereof that the Sun, and some of the Stars are many times bigger then the Earth.

With many other Rules, Tables, and Observations of daily use for most men.

By HENRY PHILLIPPES.

LONDON, Printed by *A. Maxey*, for the Company of Stationers.

THe first column shews the days of the month.

The second shews the days of the week.

The third shews many things; 1 the *Lords days*, and all other days of note on which *Fasts* or *Feasts* are kept. 2 the beginning and ending of *Terms*, with their dayes of Return or Essoyn, Exception, Returning of the Writ, and Appearance. 3. the time of the rising and setting of the Sun at *London*. 4 If you double this time of the Sun set, it shews the length of the day; or if you double the time of Sun rise, it shews the length of the night.

The fourth column shews the place of the Sun every day at noon, *viz*. the degree and minute of the Suns longitude, among the 12 signes, which he passeth thorow every yeer, moving about one degree in a day.

The fifth shews the Declination of the sun from the Equinoctial, toward the North or South Poles. These two columns are of great use in Astronomie and Navigation.

The sixth shews the place of the *Moon*: or the sign, deg. and min. which the moon *is* in every day at noon.

The seventh shews the time of the *moons* coming to the *south*: which is of good use in the Tides. Also if you add this time to the hour which the moon shines at upon any sun-dial, and allow two minutes for every hour after noon, you shall know the true time of the night thereby.

The last column shews the true time of high water at *London Bridg*, being more exactly observed & calculated then by any other; who reckon many times an hour or two to late, and so make passengers lose their Tides. And here take notice, that wheras there are 2 Tides every day or 24 hours, this alwayes shews the Tide that falls out in the day time, between six in the morning and six at night: the other Tide which falls in the night, is about half an hour later, in the middle time between the two day Tides. And that you may know the Tides in other places, observe the following table, which shewes you how to do it, both by the Moons southing, and also by the Tides at *London*.

The

The Tide Table.

h	m.			h.	m.
3	0	1	LOnd n. Tinmouth. Hartlepool. Whitbay. Amsterdam Rotterdam S W	0	0
3	45	2	Barwick Bridlington bay. Burdeux Flushing. Flamburrow. Fountnes. Ostend S W b W	0	45
4	30	3	Baltamoor, Corkhaven Kingsale. Calice. Scarborrow, Severn Bloy. Isles W S W	1	30
5	15	4	Falmouth. Foy. Humber. New-castle Garnsey. Dartmouth S. Mallows. Cardy. W by S	2	15
6	0	5	Plymouth. Hull. Lyn. Lundy. Antwerp. Waymouth. Holms of Bristow. Davids. W & E	3	0
6	45	6	Bristow. Foulnes. Start-point. Lanion Waterford. E by S	3	45
7	30	7	Milford. Bridgwater. Exwater. Lands end Capedeer. Abermorrake. E S E	4	30
8	15	8	Portland Paterpost. Harnsew. Hague. Magnes-sound. Dublin Lambay S E by E	5	15
9	0	9	Pool. Hellen. Isle of Man. Catnes. Faire-Isles. Dunbar. Ecipe S E	6	0
9	45	10	Needles Orford. Baysto. Casket Lux. South and North forelands. S E by S	6	45
10	30	11	Yarmouth. Dover Harwich, in the Frith. Bulloin, John de luce. Calice road. S S E	7	30
11	15	12	Rye. Winchesley. Gotend. Calshot. Thames mouth. Rhodes. S by E	8	15
12	0	13	Quinborrow. Southampton. Portsmouth Wight Beachy Spits. Dunkerk. South	9	0
12	45	14	Rochester. Malden. Aberden. Redban. West of the Nours. Black tail. S by W	9	45
01	30	15	Gravesend Downs. Rumney. Tenet. Silly. Blacknes. Rankins. Sen head. S S W	10	30
02	15	16	Dundee. S. Andrews. Lisbon. S Lucas. Bel-Isle. Holy-Isle. S W by S	11	15

Add these hours and min. to the time of the Moons coming South, set down in the Almanack; so you shal have the time of the Tides the common way.

Add these hours and min. to the time of the Tides at London, set down in the Almanack; so you shal have the time of the Tides my way.

If your sum exceed twelve hours, count only the overplus. Use which way you find best.

A Table ſhewing the hour of the day, by the length of the ſhadow of any walking ſtaff in the open fields, or any little ſhort ſtick, knife, book, &c. in the houſe, upon the floor, table, or window.

The ☉ High.		Dec.		Jan. No.		Feb. Oct.		Mar. Sep.		Apr. Aug		May July		June		The ☉ high	
h.	q	ft.	q	ft.	q.	ft.	q.	ft.	q.	ft.	q	ft.	q.	ft.	q.	h.	q.
0	1	28	0	26	0	25	0	24	0	25	0	27	0	28	0	0	1
	2	15	0	14	0	13	0	12	0	13	0	15	0	16	0	0	2
	3	11	0	10	0	9	0	8	0	8	0	9	0	10	0	0	3
1	●	8	2	8	0	6	2	6	0	6	2	6	3	7	2	1	0
	1	7	●	6	0	5	2	5	0	5	1	5	3	6	1	1	1
	2	6	1	5	2	4	2	4	0	4	0	4	2	5	●	1	2
	3	5	2	5	0	4	0	3	2	3	2	3	2	4	●	1	3
2	0	5	0	4	2	3	2	3	0	3	0	3	1	3	2	2	0
	1	4	2	4	0	3	1	2	3	2	3	2	3	3	0	2	1
	2	4	1	3	3	3	0	2	2	2	2	2	2	2	3	2	2
	3	4	0	3	2	2	3	2	1	2	1	2	1	2	2	2	3
3	0			3	1	2	2	2	0	2	0	2	0	2	1	3	0
	1					2	1	2	0	1	3	2	●	2	●	3	1
	2					2	1	1	3	1	3	1	3	1	3	3	2
	3					2	0	1	3	1	2	1	2	1	2	3	3
4	0					2	●	1	2	1	2	1	2	1	2	4	0

The uſe of this Table is thus, chooſe out a level place, either in the field, or in an houſe, and ſet your ſtick or ſtaff upright (or rather let it hang down, juſt touching the ground) and mark how far the ſhadow thereof doth reach, and meaſure how many times the length of the ſtaff is contained in the length of the ſhadow; and if it do not happen to be juſt whole lengths, yet you may eaſily gueſs whether it be one quarter, or an half, or three quarters of the ſtick or ſtaff more, let them be of any length whatſoever: Then turn to this Table, and conſider what month it is, & find the name of the month at the top of the Table, and look down in that columb till you finde the

the number of your measure (or the neareſt to it) and in that line, in the outmoſt columns, you ſhall ſee how many hours and quarters the Sun is high; which if it be in the morning, you muſt reckon it from the time of his riſing, but if it be in the evening, you muſt take it from the time of his ſetting, & ſo you ſhall have the time of the day.

Thus, ſuppoſe any day in the moneth of *March*, that you meaſure the ſhadow of your ſtaff, and finde it twice, or two times the length thereof: Finde this 2 o in the column under *March*, and in that line in the outmoſt column you ſhall finde 3 h. o. which ſhews that the Sun is then 3 hours high. So again, if the ſhadow be 3 times the length, then the Sun is two hours high; and if the ſhadow be ſix times the length, the Sun is but one hour high. This is the Countrey mans way of reckoning the time, who uſe to ſay the Sun is one, two, or three hours high; but what they onely gueſs at by gazing upon the Sun, you may by theſe rules know more certainly: And if you adde this to, or ſubſtract this from the time of Sun riſing or ſetting for that day, it will ſhew you what a clock it is very well.

By this Table alſo you may know the time of the night by the Moon; for firſt, you may eaſily finde the length of the ſhadow of any thing by Moon light, as well almoſt as by the Sun. Then look in the Almanack, and ſee in what Sign and degree the Moon is in, which becauſe it is caſt up for noon, for every two hours which you judge it to be paſt noon, adde one degree more: Then finde out in what month the Sun is in that ſign and degree, which the Moon is now in, which you may ſoon reckon or finde out by the column of the Suns place; and under the name of that moneth finde the length of the ſhadow, and in that line, in the outmoſt column, you ſhall ſee how many hours high the Moon is, which added to, or ſubſtracted from the time of the Moons riſing or ſetting (which is ſet down exactly in the Almanack) you ſhall have the hour of the night, as well as by moſt other ways by the Moon.

Four plaine and necessary Tables, shewing the true value of the purchase of any house or land, by lease or otherwise; calculated according to these several Rates.

5 per Cent.			6 per Cent.			8 per Cent.			10 per Cent.		
Time of the purch.	Years	moneths	Time of the purch.	Years	moneths	Time of the purch.	Years	moneths	Time of the purch.	Years	moneths
	10	7		10	11		10	11		10	11
	11	2		11	10		11	9		11	9
	11	10		12	8		12	7		12	6
	12	7		13	6		13	5		13	4
	13	4		14	4		14	3		14	2
	14	2		15	2		15	1		15	0
	15	0		15	11		15	10		15	9
	15	9		16	9		16	8		16	7
	16	7		17	7		17	6		17	5
	17	5		18	5		18	4		18	3
	18	3		19	3		19	2		19	1
	19	2		20	1		20	0		19	11
	20	0		20	11		20	10		20	9
	20	10		21	10		21	9		21	8
	21	8		22	8		22	7		22	6
	22	6		23	6		23	5		23	4
	23	4		24	4		24	3		24	2
	24	2		25	2		25	1		25	0
	25	0		25	11		25	10		25	9
	25	9		26	9		26	8		26	7
	26	7		27	7		27	6		27	5
	27	5		28	5		28	4		28	3
	28	3		29	3		29	2		29	1
	29	2		30	1		30	0		29	11
	30	0		30	11		30	10		30	9
	30	10		31	10		31	9		31	8
	31	8		32	8		32	7		32	6
	32	6		33	6		33	5		33	4
	33	4		34	4		34	3		34	2
	34	2		35	2		35	1		35	0
	35	0		35	11		35	10		35	9
	35	9		36	9		36	8		36	7
	36	7		37	7		37	6		37	5
	37	5		38	5		38	4		38	3
	38	3		39	3		39	2		39	1
	39	2		40	1		40	0		39	11
	40	0		40	11		40	10		40	9
	40	10		41	10		41	9		41	8
	41	8		42	8		42	7		42	6
	42	6		43	6		43	5		43	4
	43	4		44	4		44	3		44	2
	44	2		45	2		45	1		45	0
	45	0		45	11		45	10		45	9
	45	9		46	9		46	8		46	7
	46	7		47	7		47	6		47	5
	47	5		48	5		48	4		48	3
	48	3		49	3		49	2		49	1
	49	2		50	1		50	0		49	11
	50	0		50	11		50	10		50	9
	50	10		51	10		51	9		51	8
	51	8		52	8		52	7		52	6
	52	6		53	6		53	5		53	4
	53	4		54	4		54	3		54	2
	54	2		55	2		55	1		55	0
	55	0		55	11		55	10		55	9
	55	9		56	9		56	8		56	7
	56	7		57	7		57	6		57	5
	57	5		58	5		58	4		58	3
	58	3		59	3		59	2		59	1
	59	2		60	1		60	0		59	11
	60	0		60	11		60	10		60	9

This Table is to be used in the purchase of Leases of Land.

This Table shews the purchase of Leases of Houses.

This Table shews the purchase of Leases of Houses or Lands.

This Table shews the purchase of Leases of Houses.

Value of the Purchase.

Value of the Purchase.

Fee-simple. 16 8

Fee-simple. 12 6

Fee-simple. 10 0

These four Tables are all to be uſed the ſame way, their difference being onely in the Rate of the profit; which it is fit ſhould be more in houſes then in lands; becauſe houſes are ſubject to be voyd of Tenants, and many other caſualties of fire and ruine, which lands are not. And therefore I have (as briefly as I can) hinted in the Tables which Table is fitteſt for any kind of purchaſe: not that any one is bound to make his bargain juſt according to theſe Rates; but hereby any one may judg of his Purchaſe and know what profit he makes of his money.

The Tables of themſelves are ſo plain, that they need no explaining; I having therein altogether applyed my ſelf to the uſuall way of reckoning theſe bargains to be worth ſo many yeers purchaſe. Onely the yeer for the more exactneſſe is divided into 12 months, and not into four quarters.

This Example will make all plain.

It is deſired to know what the Leaſe of an Houſe for one and twenty yeers, is worth in ready money? To finde out this, look in the laſt Table which is calculated after the rate of 10 per Cent. and is fitteſt for ſuch kind of bargains; and in this Table at 21 yeers you ſhall finde the value of the Leaſe to be worth 8 yeers and 8 months purchaſe. So that let the yearly rent or value of the houſe be what it will, the ſaid Leaſe of 21 yeers is worth eight whole yeers rent, and almoſt three quarters of the ſaid yeerly rent; which you may eaſily reckon up, and ſo know the true value of the purchaſe. And at this price you ſhall have 10 per Cent. profit for your money.

I have made theſe Tables to ſhew the worth of long leaſes alſo, becauſe moſt men value a long leaſe too much, in reſpect of the value they ſet upon a ſhort leaſe. Reckoning a leaſe of 21 yeers to be worth but 7 yeers, and yet thinking a leaſe of 60 yeers to be worth 12 or 13 yeers purchaſe. Whereas you may ſee by this table, that though the leaſe of 21 yeers be worth 8 yeers and 8 months purchaſe; yet the leaſe of 60 yeers is not worth full 10 yeers purchaſe: nay the leaſe of an hundred yeers, or the Fee-ſimple cannot be worth above 10 yeers purchaſe, allowing the ſaid rate of 10 *per Cent.* for the money.

Many other queſtions of Purchaſes and Reverſions might be added; as you may ſee at large in my *Purchaſers Pattern*, printed for Mr. *Pierrepoint* at the Sunne in *Paul's* Church-yard.

January hath xxxi. dayes.

First quarter 1 day, 44 minutes past noon.
Full moon 9 day, 51 min. past 10 in the morning.

		Suns rise h m	set h m	place deg. m	decl. deg. m	Moons places S d m	south h m	Tide L. h m
1	a	New yeers d.		21 40	21 7	Ari. 21 19	5 A37	7 M8
2	b	7 59	4 1	22 41	21 37	Taur. 3 6	6 19	7 50
3	c	Lords day.		23 42	21 27	14 5	7 4	8 41
4	d	7 57	4 3	24 43	21 16	26 50	7 49	9 38
5	e	7 56	4 4	25 44	21 5	Gem. 8 58	8 39	10 46
6	f	Twelf day.		26 46	20 53	21 22	9 28	11 54
7	g	7 53	4 7	27 47	20 41	Can. 4 0	10 17	12 59
8	a	7 52	4 8	28 48	20 29	16 53	11 8	2 A 3
9	b	7 50	4 10	29 49	20 16	Leo 0 25	12 0	3 0
10	c	Lords day.		♒ 50	20 3	14 0	12 49	3 45
11	d	7 48	4 12	1 51	19 49	27 59	♏m38	4 22
12	e	7 46	4 14	2 52	19 36	Vir. 12 6	1 25	4 54
13	f	Hiliary	16	3 54	19 21	26 17	2 14	5 24
14	g	7 43	4 17	4 55	19 7	Lib. 10 28	4 1	5 53
15	a	7 42	4 18	5 56	18 52	24 42	4 53	6m30
16	b	7 40	4 20	6 57	18 37	Scor. 4 44	5 44	7 15
17	c	Lords day		7 58	18 21	22 45	6 37	8 11
18	d	7 33	4 27	8 59	18 5	Sag. 6 41	7 33	9 18
19	e	7 35	4 25	10 0	17 49	20 33	8 28	10 30
20	f	*Oct. Hillary.*		11 0	17 32	Cap. 4 30	9 25	11 55
21	g	*Exception.*		12 1	17 15	17 59	10 19	1 A 2
22	a	*Ret. of Writ.*		13 2	16 58	Aqu. 1 29	11 10	2 5
23	b	Term begin.		14 3	16 41	14 47	11 58	2 58
24	c	Lords day		15 4	16 23	27 52	12 43	3 39
25	d	Pauls Conv.		16 5	16 5	Pisc. 10 37	1 A 26	4 14
26	e	7 23	4 37	17 6	15 47	23 6	2 8	4 42
27	f	*Quind. Hill.*		18 7	15 48	Ari. 5 18	2 49	5 9
28	g	*Exception.*		19 7	15 9	17 24	3 32	5 35
29	a	*Ret. of Writ.*		20 8	14 50	29 14	4 13	6 M 2
30	b	*Appearance.*		21 9	14 31	Tau. 11 3	4 56	6 33
31	c	Lords day.		22 9	14 11	22 50	5 42	7 13

Last quarter 16 day, 45 min. past 8 in the morning.
New moon 23 day, 34 min. past 10 in the morning.
First quarter the 32 day, 32 min. past 10 in the morning.

	☽	*sets* h	m
1	M.	1	13
2	1	1	16
3	2	2	21
4	3	3	27
5	4	4	27
6	5	5	24
7	6	6	15
8	6	47	
9	☽	*rise*	
10	6	A	0
11	7	20	
12	8	37	
13	9	59	
14	11	20	
15	12	41	
16	mo	4	1
17	1	5	8
18	3	11	
19	4	19	
20	5	11	
21	5	56	
22	6	29	
23	☾	*sets*	
24	6	A	20
25	7	30	
26	8	38	
27	9	47	
28	10	55	
29	12	1	
30	mo.	1	
31	1	6	

The last year I have published a new Book, which will be of good use to all Seamen; it is called, The *Advancement of the Art of Navigation*; shewing by a new Canon of Sines Tangents and Secants, how to resolve all cases of Right lined Triangles only by looking into the Tables. Applied to all the three kinds of Sailing, *viz.* by the Plain Chart, by Mercators Chart, and by a Great Circle; and to the Art of Surveying. Whereunto are added, many observations for the better ordering of the Log-line, and for the more exact and ready measuring, not only of minutes but seconds of time, with some new Experiments and Engines for the more constant finding of a ships way.

Printed for Mr. *George Hurlock* and are to be sold at his shop at *Magnus* Corner.

February hath xxviii. daies.

Full moon the 7 day, 53 m. past 11 at night.
Last quarter the 14 day, 2 min. past 5 at night.

		Suns *rise.* h m	Suns *set* h m	☉ *place* deg. m.	☽ *decl.* deg. m.	Moons *place* S. deg. m.	☾ *south* h m.	*Tide L.* h m
1	d	7 12	4 48	23 10	13 51	Gem. 4 43	6 A 28	8 M 1
2	e	Purific. Mary		24 11	13 31	16 44	7 16	8 55
3	f	*Crast. Purif.*		25 11	13 10	29 12	8 29	55
4	g	*Exception*	53	26 12	12 50	Can. 11 55	8 57	11 11
5	a	*Ret. of Writ*		27 12	12 30	25 4	9 47	12 20
6	b	*Appearance*		28 13	12 9	Leo 1 39	10 39	1 A 28
7	☾	Lords day.		29 13	11 48	22 38	11 27	2 23
8	d	7 0	5 0	♓ 14	11 26	Virg. 6 58	12 18	3 17
9	e	*Oct. Purific.*		1 14	11 5	21 30	1 M 8	4 1
10	f	*Exception.*		2 15	10 43	Lib. 6 11	1 57	4 35
11	g	*Ret. of Writ*		3 15	10 22	20 50	2 50	5 9
12	a	Term ends		4 15	9 51	Sco. 5 21	3 42	5 41
13	b	6 49	5 51	5 15	9 38	19 37	4 36	6 M 17
14	☾	Lords day		6 16	9 15	Sag. 3 34	5 33	7 5
15	d	6 46	5 14	7 16	8 53	17 26	6 29	8 2
16	e	6 44	5 16	8 16	8 31	Cap. 1 4	7 24	9 5
17	f	6 42	5 18	9 16	8 8	14 29	8 19	10 19
18	g	6 40	5 20	10 16	7 45	27 41	9 11	11 30
19	a	6 38	5 22	11 16	7 22	Aqu. 10 46	9 57	12 33
20	b	6 36	5 24	12 17	6 59	23 43	10 4[illegible]	A 31
21	☾	Lords day		13 17	6 36	Pisc. 6 27	11 2[illegible]	2 22
22	d	6 32	5 28	14 17	6 13	18 44	12 5[illegible]	3 9
23	e	Shrove tuesd		15 17	5 50	Aries 1 18	12 5[illegible]	3 46
24	f	Matthias Ap.		16 17	5 27	13 29	1 A 32	4 18
25	g	6 26	5 34	17 16	5 4	25 2[illegible]	2 15	4 47
26	a	6 24	5 36	18 16	4 40	Tau. 7 16	2 58	5 14
27	b	6 22	5 38	19 16	4 17	19 7	3 43	5 41
28	☾	Lords day.		20 16	3 53	Gem. 0 5[illegible]	4 30	6 13

New moon the 22 day, 33 m. past 2 in the morning.

Moon sets h	m	
1	2 M	7
2	3	4
3	3	55
4	4	37
5	5	16
6	5	44
7	6	12
8	(rise	
9	7 A	36
10	8	59
11	10	29
12	11	42
13	12	59
14	mo.	59
15	2	10
16	3	10
17	3	59
18	4	34
19	5	3
20	5	25
21	5	44
22	(set.	
23	7 A	35
24	8	41
25	9	49
26	10	54
27	11	59
28	12	58

In these blank pages you have the time of the Moons rising and setting; which though it be troublesom to calculate, yet because I look upon it as a very pleasant and necessary observation; I have taken pains to do it much more exactly then the common rules for this purpose will perform.

Herein take notice, that I have not set down both the rising and setting every day, as for the Sun, but only one of them.

From the new Moon to the full, it shews the setting of the Moon, for then the Moon riseth in the day, and little or no notice is taken thereof; but the setting is most remarkable, for it is light all night till the Moon sets, and afterward all the rest of the night is dark: But from the full Moon to the new, I have set down the rising of the Moon, because the Moon then riseth in the night; so that it is dark all night till the Moon riseth, and afterward all the night is light.

Note also, the new Moon is scarce visible, and the full Moon riseth just at Sun setting: And at the quarters, when the Moon riseth or sets after 1 of the clock at midnight; the time doth not so properly belong to the day before, as to the day after. Therefore the same time is repeated with this mark ″, or more, to shew that the Moons rising or setting, is in the morning of the following dayes: And so in all the columns, A stands for afternoon, and M for morning.

March hath xxxi davs.

First quarter the 2 day, 24 min. past 10 in the morning.
Full moon the 9 day, 24 min. past 10 in the morning.

		Suns rise h m	☉ set h n	☽ place deg m	☉ decl deg m	Moons place S deg m	☾ south h m	Tide L h m
1	d	David	5 42	21 16	3 29	Ge. 12 47	5 A 17	6 m 50
2	e	6 16	5 44	22 15	3 6	24 32	6 6	7 36
3	f	6 14	5 46	23 15	2 42	Can. 7 15	6 56	8 31
4	g	6 12	5 48	23 15	2 18	19 57	7 46	9 33
5	a	6 10	5 50	24 14	1 55	Leo 3 4	8 35	10 40
6	b	6 8	5 52	25 14	1 3[illegible]	16 39	9 24	11 49
7	☾	Lords dav.		27 13	1 7	Virg. 0 47	10 15	12 57
8	d	2 *in lent.*		28 13	0 43	15 15	11 4	2 A 0
9	a	6 2	5 58	29 12	0 20	Lib. 0 8	11 55	2 55
10	f	6 0	6 0	♈ 11	0 4	15 10	12 49	3 45
11	g	5 58	6 2	1 Aries 11	0 28	Scor. 0 11	1 m 46	4 28
12	a	5 56	6 4	2 10	0 51	15 3	2 41	5 4
13	b	5 54	6 6	3 9	1 15	29 42	3 38	5 39
14	☾	Lords dav,		4 9	1 39	Sag. 14 7	4 35	6 m 16
15	d	3 *in Lent.*		5 8	2 2	27 51	5 32	7 4
16	e	5 48	6 12	6 7	2 25	Cap. 11 28	6 28	8 1
17	f	5 46	6 14	7 6	2 49	24 43	7 19	9 0
18	g	5 44	6 16	8 5	3 12	Aqu. 7 40	8 6	10 0
19	a	5 42	6 18	9 4	3 16	20 32	8 53	11 5
20	b	5 40	6 20	10 3	3 59	Pisc. 3 8	9 36	12 5
21	☾	Lords dav		11 3	4 22	15 34	10 19	1 A 2
22	d	*Midlent.*		12 2	4 45	27 52	11 0	1 54
23	e	5 34	6 26	13 1	5 8	Aries 10 1	11 42	2 40
24	f	5 32	6 28	14 0	5 31	22 2	12 23	3 21
25	g	Annun. Mary		La. da	5 54	Tau 3 58	1 A 7	4 0
26	a	5 28	6 32	15 57	6 17	15 47	1 52	4 32
27	b	5 26	6 34	16 56	6 40	27 36	2 35	5 0
28	☾	Lords day.		17 55	7 2	Gem. 9 7	3 25	5 30
29	d	5. *in Lent.*		18 53	7 25	21 23	4 13	6 1
30	e	5 20	6 40	19 52	7 47	Can. 3 9	5 2	6 37
31	f	5 18	6 42	20 51	8 9	15 45	5 51	7 2

☉ South declination.
☉ North declination.

March hath xxxi dayes.

Last quarter the 16 day, 50 m. past 1 in the morning.
New moon the 29 day, 32 min. past 6 in the morning.
Firstquarter 31 day, 41 min. past 9 at night.

	Moon *sets* h	m	
1	om	58	Moons setting.
2	1	49	
3	2	35	
4	3	18	
5	3	49	
6	4	15	
7	4	41	
8	5	5	
9	☾ *rise*		
10	8	A 7	
11	9	36	
12	10	55	
13	12	8	
14	mor.	8	
15	1	11	The Moons rising
16	2	4	
17	2	41	
18	3	2	
19	3	36	
20	3	5	
21	4	18	
22	4	37	
23	☾ *sets*		
24	7	45	
25	8	52	
26	9	57	
27	10	55	
28	11	53	
29	12	40	
30	m.	40	
31	1	19	

Setting.

April hath xxx dayes.

Full moon the 7 day, 2 min past 7 at night.
Last quarter 15 day, 56. m. past 11 at noon.

		Suns rise. h m	☉ set h m	☽ pla. deg. m	☉ decl degr. m	Moons place ☽ d m	☽ south h m	Hour L. h m
1	♐	5 16	6 44	21 50	8 31	Can. 28 24	6 40	8 10
2	a	5 14	6 46	22 49	8 53	Leo 11 26	7 26	9 7
3	b	5 12	6 48	23 47	9 15	24 57	8 14	10 11
4	♑	Lords day.		Palm 9	30	Vir. 9 09	3	11 19
5	d	5 8	6 52	25 44	9 58	23 31	9 53	12 28
6	e	5 6	6 54	26 43	10 19	Lib. 8 22	10 45	1 35
7	f	5 4	6 55	27 41	10 40	23 31	11 38	2 36
8	g	5 2	6 57	28 39	11 1	Sco. 8 43	12 36	3 33
9	a	Good Friday.		29 38	11 22	23 53	1m 34	4 20
10	b	4 59	7 1	♉ 36	11 42	Sag. 8 46	2 34	5 0
11	♑	Lords day.			12 3	23 20	3 33	5 35
12	d	4 56	7 4	2 33	12 23	Cap. 7 29	4 31	6m 14
13	e	4 54	7 6	3 31	12 43	21 14	5 34	6 56
14	f	4 52	7 8	4 29	13 3	Aqu. 4 41	6 16	7 47
15	g	4 50	7 10	5 27	13 22	17 32	7 28	8 38
16	a	4 49	7 11	6 25	13 41	Pisc. 0 14	8 49	9 33
17	b	4 47	7 13	7 23	14 0	12 39	8 29	10 32
18	♑	Lords day			14 19	24 51	9 20	11 29
19	d	4 45	7 17	9 19	14 38	Ari 6 58	9 5	12 24
20	e	4 41	7 19	10 17	14 56	18 56	10 32	1 A 18
21	f	4 40	7 20	11 15	15 15	Tau. 0 51	11 16	2 12
22	g	4 38	7 22	12 13	15 33	12 40	11 51	2 57
23	a	George.	7 24	13 11	15 50	24 32	12 44	3 40
24	b	4 35	7 25	14 9	16 08	Gem 6 26	1 A 33	4 1
25	♑	Lords day.		15 7	16 25	18 20	2 20	4 50
26	d	♀ in. *Paſch*		*excep*	16 42	Can. 0 21	3 9	5 21
27	e	Mark Evang		*R Bre*	16 58	12 32	3 56	5 50
28	f	Term begins		18 1	17 14	24 55	4 44	6 23
29	g	4 26	7 34	18 59	17 31	Leo 7 36	5 30	7 2
30	a	4 25	7 35	19 56	17 46	20 37	6 15	7 46

April hath xxx dayes.

New moon 22 day, 2 min. past 11 in the forenoon.
First quarter 30 day, 38 min. past 10 in the forenoon.

Moon sets			
	h	m	
1	1	M 51	Moon sets
2	2	24	
3	2	46	
4	3	11	
5	3	35	
6	3	58	
7	☾	rise	
8	8	34	
9	9	52	
10	11	0	
11	12	2	The Moons rising
12	M	2	
13	0	47	
14	1	32	
15	2	51	
16	2	12	
17	2	33	
18	2	52	
19	3	7	
20	3	26	
21	3	49	
22	☽	sets	
23	8	56	
24	9	53	Moons rising
25	10	44	
26	11	24	
27	12	0	
28	12	31	
29	M	31	
30	0	56	

May hath xxxi dayes.

Full moon 7 day, 44 min. past 2 in the morning.
Last quarter 13 day, 38 min. past 11 at night.

		Suns rise. h m	Suns set h m	⊙ place deg. m	☉ decl deg. m	Moons sign	place deg. m	☽ south h. m	Tide h m	L
1	♄	Phil. & Jam.		20 54	18 2	Vir.	3 52	7 A 2	8 38	
2	☾	Lords day.		21 51	18 17		17 35	7 50	9 39	
3	♄	*Tres Paſch.*		except	18 32	Lib.	2 10	8 38	10 44	
4	♂	*Ret. of Writ.*		23 47	18 46		16 51	9 31	11 58	
5	♀	*Appearance.*		24 44	19 0	Scor.	1 51	10 25	1 A 10	
6	☿	4 15	7 45	25 42	19 14		16 59	11 22	2 18	
7	♃	4 14	7 46	26 39	19 28	Sig.	2 9	12 22	3 20	
8	♄	4 13	7 47	27 37	19 41		17 9	1 m 23	4 12	
9	☾	Lords-day.		28 34	19 54	Cap.	1 54	2 23	4 52	
10	♄	*Menſ. Paſch*		except.	20 7		16 16	3 19	5 27	
11	♂	*Ret. of Writ.*		♎ 30	20 19	Aqu.	0 2	4 12	6 M 1	
12	♀	*Appearance.*		1 ♎ 27	20 31		13 40	5 3	6 38	
13	☿	4 6	7 54	2 m. 24	20 42		26 44	5 48	7 18	
14	♃	4 5	7 55	3 22	20 54	Piſc.	9 24	6 31	8 5	
15	♄	4 4	7 56	4 19	21 4		21 48	7 13	8 52	
16	☾	Lords day.		5 17	21 15	Ari.	3 55	7 54	9 44	
17	♄	4 2	7 58	6 14	21 25		15 53	8 36	10 41	
18	♂	4 1	7 59	7 12	21 35		27 45	9 16	11 37	
19	♀	Dunſtan	8 0	8 9	21 44	Tau.	9 34	9 59	12 37	
20	☿	Holy Thurſ.		9 6	21 53		21 23	10 44	1 A 34	
21	♃	*Graſt. Aſc.*		10 3	22 2	Gem.	3 16	11 30	2 27	
22	♄	*Exception.*		11 1	22 10		15 18	12 18	3 17	
23	☾	Lords day.		11 58	22 18		27 22	1 7	4 0	
24	♄	Term ends.		12 56	22 25	Can.	9 35	1 54	4 33	
25	♂	3 54	8 6	13 53	22 33		22 10	2 43	5 5	
26	♀	3 53	8 7	14 50	22 39	Leo	4 8	3 27	5 32	
27	☿	3 52	8 8	15 47	22 45		17 24	4 15	6 M 3	
28	♃	3 51	8 9	16 44	22 51	Vir.	0 31	5 6	37	
29	♄	3 51	8 9	17 42	22 57		13 58	5 47	7 17	
30	☾	Whitſunday.		18 39	23 2		27 36	6 33	8 7	
	♄	3 50	8 10	19 36	23 7	Lib.	11 40	7 20	9 0	

New moon 22 day, 45 min. past 2 in the morning.
First quarter the 29 day, 4 min. past 7 at night.

Moon	sets h	m.
1	1	m 18
2	1	41
3	2	1
4	2	20
5	2	54
6	3	27
7	☾	rise
8	9	A 51
9	10	41
10	11	20
11	11	52
12	12	17
13	12	38
14	12	57
15	n.	57
16	1	14
17	1	32
18	1	53
19	2	15
20	2	42
21	3	15
22	☾	sets
23	9	A 24
24	10	1
25	10	33
26	10	59
27	11	23
28	11	45
29	12	3
30	12	24
31	12	48

There will be a great Eclipse of the Sun upon the 22 of this month, about 3 of the Clock in the morning, which though it cannot be seen here, yet it wil be seen the most part of all Asia; for the middle place of the Eclipse will happen in the Longitude of 157 deg. and in 27 deg. of North latitude; which is about the South east parts of *China*, and the *Philippine* Iles. But it will be said to be seen in the Arabian sea, and so go for through the Gulph of *Bengala*, and in part be seen all over the Indian Ilands, and in some parts also of Tartarie, for it extends it self from the Equinoctial to above 50 degrees of North latitude.

June hath xxx. dayes.

Full moon the 5 day, 16 min. past 10 in the morning.
Last quarter the 12 day, 20 min. past 1 afternoon.

			Sun s rise h. m.	☉ set h m.	☉ pla. de. m	☉ dec. deg. m	Moons place sig.	d.	m	☽ south h.	m.	Tide h	L r
1	ℰ	3	49	8	11	20	33	23	11	Lib.	26	28	11	19	7
2	f	3	49	8	11	21	30	23	15	Sco.	10	35	9	5	11	22
3	g	3	49	8	11	22	27	23	18			25	32	10	3	12	41
4	a	3	48	8	12	23	24	23	21	Sag.	10	30	11	4	2	A	0
5	b	3	48	8	12	24	21	23	24			25	22	12	5	3	5
6	ℭ	Lords day.			Trin.			23	26	Cap.	10	4	1	M	3	3	57
7	d	*Craft. Trin.*			26	15	23	28			24	27	1	59	4	37
8	e	*Exception.*			27	13	23	30	Aqu.	8	27	2	50	5	9
9	f	*Ret. of Writ.*			28	10	23	31			22	7	3	35	5	37
10	g	*Corpus Christ.*			Thur			23	31	Pisc.	5	16	4	24	6	M	8
11	a	Term begins			♋	4		23	32			17	59	5	8	6	42
12	b	Longest day.			1	1		23	31	Ari.	0	25	5	50	7	20
13	ℭ	Lords day.			1	58		23	31			12	29	6	30	8	4
14	d	*Oct. Trinity.*			*excep.*			23	30			24	26	7	11	8	49
15	e	*Ret. of Writ.*			3	53		23	28	Tau.	6	14	7	53	9	43
16	f	*Appearance.*			4	50		23	26			18	1	8	39	10	46
17	g	3	48	8	12	5	46	23	24			29	50	9	25	11	50
18	a	3	48	8	12	6	44	23	21	Ge.	11	47	10	12	12	53
19	b	3	49	8	11	7	41	23	18			23	53	11	1	1	A	55
20	ℭ	Lords day.				8	38	23	15	Can.	6	10	11	48	2	47
21	d	*Quind. Trin.*			*excep*			23	11			18	40	12	38	3	35
22	e	*Ret. of Writ.*			10	32		23	6	Leo	1	24	1	A	25	4	15
23	f	*Appearance.*			11	29		23	2			14	19	2	10	4	44
24	g	John Bapt.			12	26		22	57			27	29	2	58	5	14
25	a	[illegible]		8	8	13	23	22	51	Vir.	10	47	3	44	5	42
26	b	[illegible]		8	7	14	20	22	45			24	22	4	30	6	m	3
27	ℭ	Lo[illegible] day.				15	17	22	39	Lib.	8	2	5	16	6	49
28	d	Tris[illegible] *rinity.*			*excep*			22	32			51	28	6	57	7	35
29	e	Peter [illegible] Paul			*R Wr*			22	25	Sco.	6	4	6	55	8	30
30	f	Term [illegible]			18	9	22	18			20	14	7	50	9	39

New Moon 10 day, 8 min. past 5 after noon.
First quarter 18 day, 25 min. past 1 in the morning.

Moon rises.	h	m
1	m	048
2	1	15
3	1	50
4	2	35
5	☽	rise
6	8	♌ 10
7	9	46
8	10	13
9	10	35
10	10	58
11	11	18
12	11	35
13	11	53
14	12	14
15	12	40
16	m.	40
17	1	12
18	1	49
19	2	34
20	☽	sets
21	8	31
22	8	58
23	9	22
24	9	46
25	10	7
26	10	26
27	10	48
28	11	15
29	11	45
30	12	16

July hath xxxi dayes.

Full moon the 4 day, 27 min. past 6 in the afternoon.
Last quarter the 12 day, 24 min. past 5 in the morning

		Sunsrise h m	Set h m	☉ Place deg m	☉ decl. deg m	Moons place s deg m	☽ south h m	Tide h. h m
1	g	3 56	8 4	19 6	22 10	Sag. 4 53	8 49	11 0
2	a	3 57	8 3	20 3	22 2	19 23	9 46	12 18
3	b	3 58	8 2	21 0	21 53	Cap. 3 55	10 47	1 A 38
4	☌	Lords-day.		21 57	21 44	18 22	11 44	2 43
5	d	4 1	7 59	22 54	21 35	Aqu. 2 40	12 38	3 35
6	e	4 2	7 58	23 51	21 25	16 37	1 m 28	4 15
7	f	4 3	7 57	24 48	21 15	Pisc. 0 10	2 16	4 48
8	g	4 4	7 56	25 46	21 4	13 23	3 1	5 16
9	a	4 5	7 55	26 43	20 54	26 9	3 42	5 41
10	b	7 Brethren.		27 40	20 43	Ari. 8 34	4 24	6 8
11	☌	Lords day.		28 37	20 31	20 42	5 7	6 41
12	d	4 8	7 52	29 35	20 19	Tau. 2 37	5 51	7 21
13	e	4 9	7 51	♌ 32	20 7	14 23	6 32	8 6
14	f	4 11	7 49	1 29	19 54	26 7	7 18	8 58
15	g	Swithin	48	2 26	19 41	Gem. 7 8	8 1	9 54
16	a	4 14	7 46	3 24	19 28	19 56	8 53	11 5
17	b	4 15	7 45	4 21	19 15	Can. 2 6	9 41	12 24
18	☌	Lords day		5 18	19 1	14 34	10 29	1 m 15
19	d	Dog day be.		6 15	18 47	27 19	11 18	2 14
20	e	Margaret	40	7 13	18 33	Leo 10 33	12 7	3 47
21	f	4 21	7 39	8 10	18 18	23 43	12 56	3 51
22	g	Mary Magd.		9 8	18 3	Vir. 7 9	1 A 44	4 27
23	a	4 25	7 35	10 5	17 47	21 2	2 29	4 56
24	b	4 26	7 34	11 3	17 32	Lib. 4 54	3 16	5 25
25	☌	Lords day.		game	17 16	18 50	4 6	5 56
26	d	4 30	7 30	12 58	17 0	Scor. 2 49	4 56	6 33
27	e	4 31	7 29	13 55	16 43	16 49	5 49	7 19
28	f	4 33	7 27	14 53	16 26	Sag. 0 51	6 20	7 58
29	g	4 35	7 25	15 50	16 9	14 57	6 42	8 16
30	a	4 36	7 24	16 48	15 52	Cap. 0 40	8 39	10 33
31	b	4 38	7 22	17 45	15 35	13 18	9 35	12 4

New moon the 20 day, 29 min. past 5 in the morning.
Last quarter 27 day, 40 min. past 6 in the morning.

Moon	sets. h	m
1	m.	26
2	1	15
3	2	17
4	☽	rise
5	8	A 10
6	8	36
7	8	58
8	9	17
9	9	37
10	9	56
11	10	15
12	10	41
13	11	8
14	11	44
15	12	25
16	m.	25
17	1	16
18	2	17
19	3	23
20	☽	sets
21	7	48
22	8	10
23	8	31
24	8	52
25	9	18
26	9	47
27	10	23
28	11	9
29	12	8
30	mor.	8
31	1	13

Let *London*-Bridge, and *Olaves* parish remember this 20 day of July 1654, and thank God for his wonderful deliverance of them from that terrible destruction threatened by the ship which was burnt and blown up so neer them. Also the 21 day there was another ship blown up at the other end of the Bridge, which kild some, but not so many as the first.

August hath xxxi dayes.

Full moon the 3 day, 4 min. past 4 in the morning.
Last quarter the 10 day, 19 min. past 11 at nigbr.

		Suns rise h m	☉ set h m	☉ place deg. m	☉ decl. degr. m	Moons place sig. d m	☽ south h n	Iude L. h m
1	☾	Lords day		Lam.	15 17	Cap. 27 14	10 29	1 A 28
2	b	4 41	7 19	19 41	14 59	Aqu. 11 8	11 21	2 17
3	e	4 43	7 17	20 38	14 40	24 51	12 10	3 11
4	f	4 44	7 16	21 36	14 22	Pis. 8 14	12 56	3 51
5	g	4 46	7 14	22 34	14 3	21 20	1 M 40	4 23
6	a	4 48	7 12	23 31	13 44	Aries 4 7	2 24	4 53
7	b	4 50	7 10	24 29	13 25	16 30	3 8	5 20
8	☾	Lords day		25 27	13 5	28 38	3 50	5 46
9	b	4 53	7 7	26 25	12 46	Tau. 10 31	4 35	6 m 16
10	e	Laurence 5		27 23	12 26	22 18	5 20	6 53
11	f	4 57	7 3	28 20	12 6	Gem. 4 1	6 5	7 35
12	g	4 59	7 1	29 18	11 46	15 50	6 53	8 28
13	a	5 0	7 0	♍ 16	11 26	27 50	7 42	9 28
14	b	5 2	6 58	1 ♈ 14	11 5	Can. 10 2	8 29	10 30
15	☾	Lords day		2 ♉ 12	10 44	22 33	9 18	11 42
16	b	5 6	6 54	3 10	10 23	Leo 5 34	10 7	12 46
17	e	5 8	6 52	4 8	10 2	18 50	10 55	1 A 48
18	f	5 10	6 50	5 6	9 41	Virg. 2 26	11 42	2 40
19	g	5 12	6 48	6 4	9 20	16 27	12 31	3 28
20	a	5 14	6 46	7 2	8 58	Lib. 0 39	1 A 30	4 16
21	b	5 16	6 44	8 0	8 36	14 56	2 10	4 44
22	☾	Lords day		8 59	8 15	29 16	3 2	5 17
23	b	5 20	6 40	9 57	7 53	Scor. 13 34	3 55	5 49
24	e	Bartholomew		10 55	7 30	27 42	4 51	6 m 29
25	f	5 24	6 36	11 53	7 9	Sag. 11 42	5 48	7 18
26	g	5 26	6 34	12 52	6 46	25 40	6 45	8 19
27	a	5 28	6 32	13 50	6 24	Cap. 9 29	7 40	9 26
28	b	Dog days end		14 48	6 1	23 10	8 31	10 35
29	☾	Lords day		15 47	5 38	Aqu. 6 49	9 24	11 50
30	b	5 33	6 27	16 45	5 16	20 20	10 12	12 53
31	e	5 35	6 25	17 43	4 53	Pisc. 3 38	10 59	1 A 54

August hath xxxi. dayes.

New moon the 18 day, 54 m. past 4 afternoon.
First quarter 25 day, 20 min. past noon.

Moon	sets h	m	
1	2m	47	
2	3	44	
3	☽	rise	The Moons rising.
4	7A	21	
5	7	40	
6	8	1	
7	8	23	
8	8	46	
9	9	14	
10	9	45	
11	10	25	
12	11	14	
13	12	10	
14	m.	10	
15	1	11	
16	2	20	
17	3	34	
18	☽	sets	Moons setting.
19	6A	42	
20	7	5	
21	7	30	
22	7	59	
23	8	32	
24	9	15	
25	11	11	
26	11	15	
27	12	24	
28	m.	24	
29	1	37	
30	2	52	
31	4	5	

September hath xxx dayes.

Full moon the 1 day, 58 min. past 3 afternoon,
Last quarter the 9 day, at 6 of the Clock at night.

		Suns rise h m	☉ set h m	☉ pla. degr. m	☉ decl. degr. m	Moons place S d m	☽ south h m	Tide L h m
1	f	Giles	6 23	18 42	4 30	Pis. 16 44	11 45	2 A 44
2	g	5 39	6 21	19 41	4 7	29 36	12 29	3 27
3	a	5 41	6 19	20 39	3 44	Ari. 12 10	1 m 8	4 1
4	b	5 43	6 17	21 38	3 21	24 29	1 56	5 35
5	☌	Lords day		22 36	2 58	Tau. 6 37	2 40	5 3
6	d	5 47	6 13	23 35	2 34	18 26	3 26	5 31
7	e	5 49	6 11	24 34	2 11	Ge. 0 14	4 11	6 m 0
8	f	Nativ. Mary	25 32	1 48		11 58	4 58	6 34
9	g	5 53	6 7	26 31	1 24	23 47	5 46	7 16
10	a	5 55	6 5	27 30	1 1	Can. 5 45	6 33	8 7
11	b	5 57	6 3	28 29	0 37	17 58	7 21	9 1
12	☌	Lords day		29 27	0 *14	Leo 0 32	8 9	10 4
13	d	5 1	5 59	0 ♎ 26	0 10	13 29	8 56	11 9
14	e	6 3	5 57	1 25	0 33	26 53	9 45	12 17
15	f	6 5	5 55	2 24	0 57	Vir. 10 45	10 33	1 A 20
16	g	6 7	5 53	3 23	1 20	24 56	11 20	2 16
17	a	6 9	5 51	4 22	1 44	Lib. 9 28	12 11	3 11
18	b	6 10	5 50	5 21	2 7	24 13	1 A 4	3 58
19	☌	Lords day		6 20	2 31	Scor. 8 58	2 1	4 38
20	d	6 14	5 46	7 20	2 54	23 36	2 57	5 14
21	e	Matthew Ap.		8 19	3 18	Sag. 8 7	3 55	5 49
22	f	6 18	5 42	9 18	3 41	22 22	4 51	6 m 29
23	g	6 20	5 40	10 17	4 4	Cap. 6 23	5 46	7 16
24	a	6 22	5 38	11 16	4 28	20 8	6 42	8 16
25	b	6 24	5 36	12 16	4 51	Aq. 3 16	7 33	9 18
26	☌	Lords day		13 15	5 14	16 58	8 23	10 24
27	d	6 28	5 32	14 15	5 38	Pisc. 0 8 9	8	11 40
28	e	6 30	5 30	15 14	6 0	12 59	9 54	12 29
29	f	Michael Arc.		16 14	6 23	25 45	10 36	1 A 23
30	g	6 34	5 26	17 13	6 46	Aries 8 17	11 13	2 8

North Declination

South Declination

September hath xxx daves.

New moon the 17 day, 38 min. past 2 in the morning.
First quarter the 23 day, 27 min. past 7 at night.

	Moon rise. h	m	
1	☽ rise		
2	6	A 14	
3	6	33	
4	6	59	
5	7	23	
6	7	53	
7	8	31	
8	9	14	Moons rising.
9	10	8	
10	11	4	
11	12	9	
12	mor.	9	
13	1	18	
14	2	31	
15	3	51	
16	4	9	
17	☽ sets		
18	6	A 7	
19	6	32	
20	7	23	
21	8	15	Moons setting.
22	9	15	
23	10	24	
24	11	37	
25	12	47	
26	m.	47	
27	2	6	
28	3	17	
29	4	28	
30	5	30	

October hath xxxi. dayes.

Full Moon 1 day, 57 min. past 7 in the morning.
Last quarter 9 day, at noon.

		Suns rise. h m	☉ set h m	☽ pla. d m	☉ decl. d m	moons place sig d m	☽ sou. h m	Tide L h m
1	a	6 36	5 24	18 13	7 9	Ari. 20 39	12 23	2
2	b	6 38	5 22	19 13	7 32	Tau. 2 48	12 49	3 45
3	ℂ	Lords day		20 13	7 55	14 47	1m 32	4 18
4	d	6 42	5 18	21 12	8 17	26 39	2 19	4 50
5	e	6 44	5 16	22 12	8 39	Gem 8 26	3 5	5 18
6	f	Faith	5 14	23 12	9 2	20 13	3 51	4 47
7	g	6 48	5 12	24 12	9 24	Can. 2 54	4 40	6m 20
8	a	6 50	5 10	25 11	9 46	14 0	5 26	9 58
9	b	Denis	5 8	26 11	10 8	26 13	6 11	7 42
10	ℂ	Lords day		27 11	10 29	Leo 8 43	6 58	8 34
11	d	6 56	5 4	28 11	10 51	21 39	7 44	9 31
12	e	6 58	5 2	29 11	11 12	Virg. 4 59	8 32	10 35
13	f	Edward	5 0	☊ 11	11 34	18 49	9 18	11 40
14	g	7 1	4 59	1 ☌☽ 11	11 55	Lib. 3 0	10 8	12 48
15	a	7 3	4 57	2d 0 11	12 15	17 44	11 0	1A 54
16	b	7 5	4 55	3 0 11	12 36	Scor. 2 43	11 54	2 54
17	ℂ	Lords day		4 11	12 57	17 51	12 52	3 47
18	d	Luke Evang.		5 11	13 17	Sag. 2 47	1A 51	4 31
19	e	7 11	4 49	6 11	13 37	13 38	2 50	5 9
20	f	*Ivis. Micha.*		7 12	13 57	Cap. 2 14	3 48	5 45
21	g	*Exemption.*	4 46	8 12	14 16	16 31	4 46	6m 25
22	a	*Rec. of Writ.*		9 12	14 26	Aqu. 0 25	5 39	7 10
23	b	Term begins		10 13	14 55	13 58	6 28	8 2
24	ℂ	Lords day		11 13	15 14	27 10	7 14	8 53
25	d	Chrispin	4 39	12 13	15 33	Pis. 10 37	7 59	9 51
26	e	7 23	4 37	13 14	15 51	22 45	8 42	10 50
27	f	*Mense Mich.*		14 14	16 9	Ari. 5 109	23	11 47
28	g	Sim. & Jude		*Exce.*	16 27	17 26	10 6	12 45
29	a	L. Majorsday		*R. Wr.*	16 45	29 33	10 49	1A 41
30	b	*Appearance.*		17 16	17 2	Tau 11 23	11 34	2 32
31	ℂ	Lords day.		18 16	17 19	23 23	12 29	3 27

October hath xxxi. dayes

New moon the 16 day, 48 min. past noon.
First quarter, 23 day, 50 min past 4 in the morning
Full moon the 31 day early in the morning.

Moon rise h	m	The Moons rising.
1	rise	
2	5 A	37
3	6	1
4	6	35
5	7	21
6	8	13
7	9	5
8	10	5
9	11	9
10	12	22
11	mo	22
12	1	32
13	2	46
14	4	2
15	4	46
16	☾	(set)
17	5 A	22
18	6	11
19	7	11
20	8	16
21	9	32
22	10	48
23	12	3
24	mor.	3
25	1	11
26	2	25
27	3	31
28	4	37
29	5	42
30	6	48
31	7	50

The Moons setting.

November hath xxx daves.

Last quarter the 8 day, 46 min. past 3 in the morning.
New moon the 14 day, 5 min. past 11 at night.

			Sun rose h m	☉ set h m	☉ pla. d m	☉ decl. d m	Moons place ☾ d m	☽ south h m	Tide L. h m
1	D	All Saints.	19 17	17 36	Gem. 5	13	1 m 5	3 58
2	e	All Souls.	20 17	17 52		17 2	1 52	4 32
3	f	Graft. Anim	21 18	18 8		28 54	2 38	5 2
4	g	Exception. 21	22 19	18 24	Can. 10	47	3 27	5 32
5	a	Powder Plot.	23 19	18 40		22	4 12	6 m 1
6	b	R. Wr. Appear	24 20	18 55	Leo 5		4 56	6 33
7	C	Lords day.	25 21	19 9		17 34	5 41	7 12
8	d	7 45 4 15	26 22	19 24	Vir. 0	26	6 26	7 59
9	e	7 47 4 13	27 22	19 34		13 37	7 11	8 49
10	f	7 48 4 12	28 23	19 52		27 16	7 56	9 46
11	g	Martin 11	29 24	20 5	Lib. 11	23	8 47	10 57
12	a	Graft. Mart.	✕ 25	20 18		25 51	9 38	12 8
13	b	Exception.	1 26	20 31	Scor. 10	48	10 32	1 A18
14	C	Lords day	2 27	20 43		25 54	11 32	2 29
15	D	R. Wr. Appear	3 28	20 55	Sag. 11	5	12 32	3 29
16	e	7 56 4 4	4 29	21 6		26 11	1 A33	4 19
17	f	Hugh 4 3	5 30	21 17	Cap. 11	5	2 32	4 58
18	g	Ob. Mart.	6 31	21 28		25 39	3 29	5 33
19	a	Exception.	7 32	21 38	Aqu. 9	50	4 21	6 m 0
20	b	Ret. of Writ	8 33	21 48		23 31	5 8	6 42
21	C	Lords day	9 34	21 57	Pis. 6	49	5 54	7 24
22	D	Appearance	10 35	22 5		19 43	6 38	8 12
23	e	Clement 57	11 36	22 15	Aries 2	57	7 19	8 59
24	f	8 4 3 56	12 37	22 23		14 32	8 0	9 53
25	g	Quind. Mart	13 38	22 31		26 37	8 44	10 53
26	a	Exception.	14 39	22 38	Tau. 8	31	9 27	11 53
27	b	Ret. of Writ.	15 41	22 45		20 20	10 10	12 50
28	C	Lords day	16 42	22 51	Gem. 2	9	10 56	A49
29	D	Term ends.	17 43	22 57		14 0	11 43	2 42
30	e	Andrew 290.	18 44	23 2		25 52	12 30	3 27

Sagittarius

First quarter the 21 day. 34 min past 5 after noon.
Full moon the 29 day, 13 min. past 8 at night.

Moon	rise h	m
1	5 A	18
2	6	3
3	6	58
4	8	0
5	9	2
6	10	1
7	11	17
8	12	29
9	m.	29
10	1	44
11	2	57
12	4	17
13	5	28
14	☽ sets	
15	4 A	44
16	5	49
17	7	3
18	8	24
19	9	41
20	10	53
21	12	4
22	mo.	4
23	1	16
24	2	21
25	3	28
26	4	35
27	5	35
28	6	34
29	☾ rise	
30	4	41

Upon the 14 of November, about 11 of the Clock at night there will be another great Eclipse of the Sun; but as this cannot be seen of us, so it will scarce be seen of any, because it happens in the great vast Ocean beyond America, the middle thereof being about 208 deg. of Longitude, and in 17 deg. of South latitude. So that though the extent of this Eclipse be as great as the former, yet it happens in such a desolate place, that there are few or none shall see or take notice thereof.

This year there is no Eclipse of the Moon at all.

December hath xxxi. dayes.

Last quarter the 7 day, 30 min. past 5 at night
New moon the 14 day, 46 min. past 9 in the morning.

		Suns *rise* h m	*set* h m	*pla.* deg m	*decl* deg m	Moons *place* sig d m	*south* h m	*Tide L* h m
1	f	8 10	3 50	19 45	23 8	Can. 7 50	1m 17	4 8
2	g	8 11	3 49	20 47	23 11	19 54	2 3	4 39
3	a	8 11	3 49	21 48	23 16	Leo 2 9	2 47	5 8
4	b	8 12	3 48	22 49	23 20	14 30	3 32	5 35
5	☌	Lords day		23 51	23 23	27 54	15	6 m 3
6	d	8 12	3 48	24 52	23 25	Virg 9 59	5 0	6 36
7	e	8 12	3 48	25 53	23 28	22 59	5 43	7 14
8	f	8 13	3 47	26 54	23 29	Lib. 6 38	6 31	8 5
9	g	The days are		27 55	23 30	20 23	7 19	9 0
10	a	at a ſtand		28 56	23 31	Scor. 9 41	8 10	10 6
11	b	Shorteſt day		29 57	23 32	19 20	9 6	11 23
12	☌	Lords day		♑ 59	23 31	Sag. 4 10	10 4	12 43
13	d	days increaſe		2 0	23 31	9 16	11 4	2 A 6
14	e	8 13	3 47	3 1	3 29	Cap. 4 21	2 3	3 3
15	f	8 13	3 47	4 3	23 28	19 18	1 A 3	57
16	g	8 12	3 48	5 4	23 26	Aqu. 4 1	1 59	4 37
17	a	8 12	3 48	6 5	23 23	18 21	2 50	5 9
18	b	8 12	3 48	7 7	23 20	Piſ. 2 13	3 37	5 38
19	☌	Lords day.		8 8	23 17	15 38	4 23	6 m 8
20	d	8 11	3 49	9 9	23 13	28 36	5 7	6 41
21	e	Thomas Apoſt.		10 11	23 8	Ari. 11 10	5 49	7 19
22	f	8 10	3 50	11 12	23 3	23 25	6 33	8 7
23	g	8 9	3 51	12 13	22 58	Tau. 5 22	7 14	8 53
24	a	8 8	3 52	13 15	22 52	17 14	7 59	9 51
25	b	Chriſts birth		14 16	22 46	29 5	8 44	10 53
26	☌	Lords day		Steph.	22 39	Gem. 10 47	9 31	11 58
27	d	John Evang.		16 18	22 32	22 37	10 17	1 A 0
28	e	Innocents.		17 20	22 24	Can. 4 38	11 3	1 58
29	f	8 4	3 56	18 21	22 16	16 43	11 50	2 49
30	g	8 3	3 57	19 22	22 8	29 2	2 36	3 33
31	a	8 2	3 58	20 23	21 58	Leo 11 3	1m 23	4 17

Carnomus

December hath xxxi. dayes.

First quarter 21 day, 58 min. past 9 in the morning.
Full moon the 29 day, 28 min. past 3 afternoon.

	Moon *sets* h	m
1	5	A41
2	6	43
3	7	45
4	8	54
5	10	1
6	11	14
7	12	27
8	m.	27
9	1	41
10	3	10
11	4	21
12	5	36
13	6	48
14	☽	*sets*
15	5	41
16	6	49
17	8	18
18	9	24
19	10	47
20	11	55
21	morn	
22	1	3
23	2	11
24	3	11
25	4	10
26	5	10
27	6	3
28	7	47
29	☽	*rise*
30	5	26
31	6	31

We count time now by years, and monthes, and dayes;
But shortly we shall reckon't other wayes.
A thousand years in Heaven a day appears,
One day in Hell seems as a thousand years.
Lord teach us count our dayes so by thy grace,
To scape thy wofull, finde that happy Place.

A Table of INTEREST at 6 per Cent.

	a Day		a Week		a month		3 months		6 months		a Yeare	
	d	c	sh d	c	sh d	c	li sh d	c	li sh d	c	li sh d	c
Shillings	1	0	1		6		18		36		72	
	2	0	2		12		36		72		1 44	
	3	0	4		18		54		1 08		2 16	
	4	0	5		24		72		1 44		2 88	
	5	0	7		30		90		1 80		3 60	
	6	1	8		36		1 8		2 08		4 32	
	7	1	10		42		1 26		2 52		5 04	
	8	1	11		48		1 44		2 88		5 76	
	9	1	12		54		1 62		3 24		6 48	
	10	2	13		60		1 80		3 60		7 20	
Pounds	1	4	27		1 20		3 60		7 20	1	2 40	
	2	8	55		2 40		7 20		1 2 40	2	4 80	
	3	12	82		3 60		10 80		1 9 60	3	7 20	
	4	15	1 10		4 80		1 2 40		2 4 80	4	9 60	
	5	19	1 38		6 00		1 6 0		3 0 00	6	0 00	
	6	23	1 65		7 20		1 9 60		3 7 20	7	2 40	
	7	27	1 93		8 40		2 1 20		4 2 40	8	4 80	
	8	31	2 21		9 60		2 4 80		4 9 60	9	7 20	
	9	35	2 48		10 80		2 8 40		5 4 80	10	9 60	
	10	39	2 76		1 0 0		3 0 0		6 0 0	12	0 0	
	20	79	5 52		2 0 0		6 0 0		12 0 0	1 4	0 0	
	30	1 18	8 28		3 0 0		9 0 0		18 0 0	1 16	0 0	
	40	1 58	11 4		4 0 0		12 0 0		4 0 0	2 8	0 0	
	50	1 97	1 1 80		5 0 0		15 0 0		10 0 0	3 0	0 0	
	60	2 36	1 4 57		6 0 0		18 0 0		16 0 0	3 12	0 0	
	70	2 76	1 7 33		7 0 0		1 1 0 0		2 0 0	4 4	0 0	
	80	3 15	1 10 9		8 0 0		1 4 0 0		8 0 0	4 16	0 0	
	90	3 55	1 12 85		9 0 0		1 7 0 0		2 14 0	5 8	0 0	
	100	3 94	2 1 61		10 0 0		1 10 0 0		3 0 0 0	6 0	0 0	

This Table shewes the Interest of any sum of many from 1 s to 100 li. from a day to a yeare. And by a little addition you may know the Interest of any sum whatsoever. Note, that for more exactness the peny is divided into an hundred parts 3 so that 25 parts are a farthing, 50 parts an half peny, 75 parts 3 farthings.

For example, the Interest of an 100 l. for six months, one week, and one day are thus found,

	li	sh	d	c
Interest of a 100 l. for six months	3	0	0	00
Interest of a 10 l for a week	0	2	3	61
Interest of a 100 l for a day	0	0	3	94
In all	3	2	7	55

That is 3 pounds, 2 shillings, 7 pence, half peny

A DEMONSTRATION of the Wonders of ASTRONOMY.

Plainly shewing how the vast Magnitude of the Heavens, Sun, Moon and Stars may be known; and proving, that the Sun, is (at the least) 166 times bigger then the Earth.

IT is in this Art as in all others, if you would understand things plainly, you must begin at the first and lowest principalls thereof, by which in all likelyhood the Art come to be first discovered: and they were some such common observations, as these.

First it is manifest by daily experience, (by *Copernicus* his leave) that the Sun and Moon have a daily motion round about the Earth. So that in the space of a natural day, or 24 howers, they first rise in the East, and so pass forward to the South; and though they set in the West, yet they are not Idle, but still continue on their course under the Earth, and so come in the Morning to their place of rising again. For the Earth is placed in the midst of the World, and the heavens encompass it round about on every side alike: So that the Sun or Moon when they set, are not idle, or take their rest as the Poets fain, but still continue on their course, by night as well as by day; so that it is alwayes day to some part of the Earth or other, though it be night with us.

Secondly, it is apparent that the Moon (besides the said daily motion round about the Earth) hath also a kind of motion from the Sun; whereby she seems to move more slowly then the Sun: coming to the South every day about 48 minutes later then other, and so by departing from the Sun, comes to encrease, and decrease in light, returning to the Sun again in 29 dayes and an halfe; which course is usually distinguished by the new Moon, full, and quarters.

Thirdly, with a little more diligence you may observe, that all the whole number of stars also, do not stand

still; but have a daily motion round about the Earth, as the Sun and Moon have: the most of them, rising, Southing, and setting as they doo only some stars near the North Pole; in these Northern Countries never set; but have a constant motion round about the Pole; (as *Charles* his wayn, the little Bear, &c. Thereby the more plainly shewing that the other stars keeping equall pace with them, must needs turn round about the Earth; though we can only see their motion above the Earth, and so they seem to us to rise and set, as the Sun and moon doth, which rising and setting is only in respect of the Earth, and not of the Heavens.

4 These stars for their better distinction in maps and Globes, are divided into 48 constellations, having the pictures of men or Beasts; the chiefest, whereof are the 12 signes in the Zodiack. By this means each star hath a name, according to the part of the Image it is placed in; and the number of the stars, is thus found out to be 1025. besides those few which are lately found to the South-ward.

5 You see by experience that the Sun hath not only a daily motion round about the Earth, but hath also another motion according to the several seasons of the year. For in the winter time the Sun runneth his course almost along upon the ground; but in the Summer time he fetcheth his daily compass almost over our heads. This is caused by the Proper motion of the Sun, through the Twelve signes of the Zodiack, and the time of this revolution is 365 day six hours, which is the measure of our Julian year, composed by *Julius Cæsar* 45 years before the birth of our Lord.

6 As the Sun hath this yearly motion through the 12 signes of the Zodiack, so the Moon hath a monthly motion through the Same: So that though the moon in her daily motion seems to rise, South, & set every day somewhat slower then the sun, it is because that in her motion in the Zodiack she moves so much faster then the Sun, running through all the 12 Signes in 27 dayes 7 hours 43 minutes

nutes. In which ſpace of time you may ſee the Moon not only make the ſame higher and lower courſes as the Sun doth in the Summer and Winter, according to the North or South ſituation of the ſignes; but alſo may ſee her motion from one Sign to another, by her moving to or from the ſeveral ſtars therein. And thus theſe two things, the 12 Signes of the Zodiack, and the way of the moon therein, are moſt plainly ſhewed, and demonſtrated, the one by the other, which cannot ſo well be ſeen in the Sun, becauſe his light doth dim the light of the ſtars which are neer him, which the light of the moon doth not.

7 If yet you ſomewhat more heedfully obſerve theſe ſtars in the Zodiack, you ſhall find ſome few ſtars amongſt them, ſomewhat bigger then the reſt, and which do not twinkle ſo much as the other ſtars do. Theſe are the Planets; which though they may ſeem at firſt to have one and the ſame motion with the other ſtars, yet by a few nights obſervation you ſhall plainly perceive that they have another motion of their own, and that they keep not one and the ſame place as the other ſtars do, but move to and fro among the ſtars of the Zodiack. Theſe are therefore called Planets or wandering ſtars, and there are five of them which are thus named and characteriſed, ♄ *Saturn*, ♃ *Jupiter*, ♂ *Mars*, ♀ *Venus*, ☿ *Mercury*. The firſt four of theſe are great and eminent ſtars, eſpecially *Jupiter* and *Venus*, being the two brighteſt in the whole heaven, and therefore moſt taken notice of. But *Mercury* is ſomewhat ſmall and ſo continually hidden under the Sun beams, that he is ſeldom to be ſeen, and ſo little notice can be taken of him.

8 By continued obſervations it may be found out, that as theſe Planets have a different motion from the fixed ſtars, ſo likewiſe that each of them have a ſeveral motion proper to themſelves, ſome of them moving faſter and ſlower then others. So that though all of them have a general motion through the Zodiack or 12 ſignes, yet they finiſh their revolutions in different times. So that *Venus*

and *Mercury* are observed to keep equal pace with the Sun, and so finish their course in a year, But *Mars* is almost two years, *Jupiter* almost 12 years, & *Saturn* almost 30 years in performing their motion through the 12 signs of the Zodiack.

Now I hope you do not expect I should demonstrate unto you the Theory of all these Planets and shew unto you their motions of Latitude and Longitude, and why they move sometimes more swiftly and sometimes more slowly, yea sometimes backward as well as forward, all which things are wonderful, and worth your knowledg. This is a work that requires a larger Treatise, But hereby in a general way you may plainly see, that there are at the least eight Orbes or motions in the Heavens, *viz.* the Sun, the moon, the five other Planets, and the heaven of fixed Stars, which also hath a slow motion scarce perceivable, moving only one degree in 70 years, and so finishing their course in 25000 years.

These are some of the first steps and degrees whereby men have attained to the knowledg of these wonderful things, and hither to Astronomers reasonably well agreed: But now there is great dispute and controversie about the placing of these Planets in the heavens, yet herein also thus far all agree, that the moon is nearest to the Earth, that *Saturn* is the farthest, next *Jupiter*, and then *Mars*, and that the Sun *Venus* and *Mercury* are between the moon and *Mars*. So that according to the three great masters of Astronomy, *Ptolomy*, *Copernicus*, and *Tycho*, the Planets are placed somewhat after this manner.

The order of the Planets, according to

Ptolomy.	*Copernicus.*	*Tycho:*
The Stars.	The Stars	The Stars
Saturn.	*Saturn*	*Saturn*
Jupiter	*Jupiter*	*Jupiter*
Mars	*Mars*	*Mars*
Sol	The Earth	The Sun, with
Venus	and Moon	*Mercury* & *Venus*
Mercury	*Venus*	Moon
Luna	*Mercury*	The Earth is the
Earth is the Centre.	*Sol* is the Centre.	Centre.

I shall not now dispute concerning the truth of either of these opinions; But that which I chiefly intend at this time, is as plainly as I can to demonstrate unto you the vast magnitude of these heavenly bodies; which though it be a thing agreed upon by all Artists, yet it is that which seems most strange and incredible to all other men. And therefore being to inform those who have little or no skill in Art, you must not look for any curious demonstrations, but only such as may make it probable in a generall way to such men.

And in the first place, whereas according to common sence and opinion, the Sun being at the highest; and shining brightest seems unto us little bigger then a foot-ball, and when it is rising or setting though it seems somewhat bigger, yet seems not past the breadth of a bushel, I shall give unto you a plain experiment, which shall prove unto you that it is many 100 times bigger; and though the experiment happened to me accidentally, yet you may make the like proof and trial many times.

Being one evening with some friends in *Deptford* fields in the month of May, the evening faire, and the Sun just upon its setting, it chanced so that Pauls steeple was just between the Sun and us: Now you would think that this steeple being so great, might very well hide the whole body of the Sun from our sight; but I took special notice of it, and shewed it to those that were with me, that the body of the Sun did plainly appear upon both sides of the steeple, in such sort that the steeple did scarce hide the one halfe of the Sun from us, but the steeple appeared to us just like the snuffe or wick in the midst of the flame of a burning Candle. By this experiment therefore at the first sight to any apprehension, it may plainly appear, that the Sun must needs be much broader then Pauls steeple, and therefore much bigger then a foot-ball or a bushel, or many hundred bushels, as I said before. But now if you examin this experient a little more artificially, and first consider the distance between us and the steeple which was about two miles and an halfe and compare thi

with the distance which the Sun is from the Earth, which you must needs grant to be very great, and if you will take the Astronomers account, it is about four millions of miles. Secondly, if you consider the breadth of the steeple, which in this Diagonal position could not be less then four Poles, and thirdly, if you suppose the steeple had just hid all the Suns body; then according to these suppositions the body of the Sun will be found to be six million and four hundred thousand Poles in the breadth thereof.

For as the distance of the steeple 1 miles and an half.
To the breadth of the steeple——4 Poles;
So the distance of the Sun, 4000000 of miles,
To the breadth of the Sun, 6400000 of Poles.

But as I said before the steeple did scarce hide halfe the body of the Sun from us, therefore the Sun must be at the least as broad again, which will be 12 millions and 8 hundred thousand Poles; which reduced into miles, by dividing 12800000 Poles by 320 which are the Poles contained in one mile, makes 40000 miles. This you see the breadth of the Sun according to this experiment which agrees well enough with the ordinary account of Astronomers, who makes it between 5 and 6 times broader then the Earth, as you shall see more, by that which followeth.

A second way whereby I shall somewhat more Artificially demonstrate unto you the vast magnitude of these heavenly bodies, shall be taken from the consideration of the true quantity of the Earth it self: I mean this Globe of Earth and water, which makes but one round Globe, being encompassed round about on every side with the heavens. Now there is none but will readily beleeve that the Earth is a very great body, If you would know the dimensions thereof, take these general rules and observations.

Astronomers do alwayes divide the compass of any circle into 360 parts or degrees, and it is found by experience, that each of these degrees in the compass of the Earth, doth amount to about 60 miles; so that if you multiply

multip'y 360, by 60, the compaſs of the whole Earth will not be found to be 21600, miles: And ſo the Diameter or breadth of the Earth, according to the ordinary proportion of 22 to 73 will be 6873 miles, and the halfe of this being the ſemidiameter, from the outſide to the Center is 3436 miles and an halfe. In the next place it is agreed upon by Aſtronomers, that the bodies of the Sun and moon (being much alike as their viſible bignes) are about halfe a degree of a circle (divided as aforeſaid into 360 degrees) rather more then leſs, being according to the beſt obſervations, in their mean diſtance 32 minutes in their diameters. This therefore being known that halfe a degree upon the Earth makes 30 miles; the breadth of the Sun or moon being halfe a degree, muſt needs be 30 miles over: yea though you ſhould ſuppoſe them to move as cloſe as they would to the very outſide of the Earth, as a ſhip doth upon the ſea, or the loweſt clouds in the Air. And this is enough to prove that the ſun or moon are much bigger then a foot-ball or a buſhel according to common and childiſh conceits and apprehenſions.

You cannot deny this to be truth unleſs you doubt whether the ſun or moon are the halfe of a degree; of ſuch a great circle as muſt go about the Earth. But this is plain and eaſy to be tryed by any large inſtrument, that the viſible diameter of the ſun and moon are halfe a degree thereof. If you have no better way for the tryal hereof, you may either make, or ſuppoſe a great circle in a large room, let the breadth of the circle be 19 foot one inch, the halfe breadth or from the midſt to the outſide 9 feet ſix inches and an half; in this circle you may lay down juſt 720 ſix-pences, each ſix-pence being one inch, and ſo every ſix-pences will make halfa degree, and each ſix-pence will appear as a little ſun; And if your eye were in the center of this circle, it would juſt hide the body of the ſun from your ſight. You may try this by a ſingle ſix-pence likewiſe, if you place it upon the end of a ſtaffe which is 9 foot ſix inches and an halfe long, and ſo ſet the one end of the ſtaffe to your eye, and turn the other end with the

six-pence to the sun, and you shall find it will hide the sun, And as it is in such a circle, so it will be in any other; only the greater the circle is, the greater will this 720 part thereof be, which in the compass of the Earth comes to about 30 miles, as aforesaid.

But now all this is gathered from this supposition, as if so be the sun or moon should move round the Earth just upon the very outside thereof; Therefore to improve this conclusion you must know that the moon (which is much lower then the sun, yet) is distant from the Earth many semidiameters of the Earth. If it were not so we which live upon the outside of the Earth, should easily perceive a great irregularity in her motion, being sometimes much nearer to us then at other times. And indeed though this neither is, nor can be perceived by common men; yet those that are skilful in Astronomy, by the use of large and exact instruments, do find the difference of appearance, which they call Parallax, to be very sensible in the moon; to the quantity of about one whole degree; and hereby they conclude that the moon is about 60 semidiameters of the Earth from us. Now the semidiameter of the Earth being as it were the Radius or measure whereby this distance is found out, therefore they reckon these distances of the sun and moon first in semidiameters of the Earth, which you may afterward reduce into miles; each semidiameter being 3436 miles.

Now it is plain in Geometry, and also to reason, that if halfe a degree, or the 720 part of a circle, whose breadth and compass is equal to the breadth and compass of the Earth, be 30 miles; then the 720 part, or half a degree of a circle, whose breadth and compass is 2, 3, 4, 5, 6, or any other number of times, bigger then the breadth and compass of the Earth; should be 2, 3, 4, 5, 6 times, &c bigger; so that if halfe a degree in the one be 30 miles, then half a degree in the other must be 3, 4, 5, or 6 &c. times 30 miles.

And therefore the moon being 60 semidiameters from the Earth, must needs be 60 times broader then was before said; because that was only supposed as if the moon had

had moved close to the outside of the earth, but the moon moves in her Orb or Circle 60 times farther from the earth then it is from the outside of the earth to the Center thereof, and so it is 60 times 30 miles, or rather 60 times 32 miles over, which makes 1920 miles. As for the distance of the moon from the earth; the moon being 60 semidiameters distant, and each semidiameter being 3436 miles; multiplying the one by the other, wil appear to be 206160, which is above two hundred thousand miles. And thus by degrees I have plainly demonstrated unto you how the distance and magnitude of the Moon is found out.

The same way must be taken for the *Sun*; only his distance being so far from us, his *Parallax* is very little and scarce to be observed by any instruments, which causeth some difference among Astronomers. It will be needless to shew all their several observations concerning it, take this only in general, which wil agree to the most of them, That the *Sun* is above 20 times farther from us then the moon, & therefore their visible diameters being the same, the true diameter or bredth of the *Sun* must needs be 20 times more then the moon. So that the diameter of the moon being as aforesaid 1920 miles, this multiplied by 20 shews the diameter of the *Sun* to be 38400, or almost 40000 miles. Hereby it appears that the Sun is above 5 times and an half broader then the whole earth, which was shewed before to be but 6873 miles. And so likewise the compass of the Sun will be above 5 times and an half more then the compass of the earth; that being 21600 miles, and the compass of the Sun wil be about 120686, or (if you wil) 120000 miles about.

But me thinks I hear some ready to say to me, though this magnitude of the Sun and moon which you have demonstrated be very great, yet it is nothing in comparison of what others speak thereof; for *Ptolemy* makes the sun, to be 166 times bigger then the earth, whereas you make it not ful 6 times broader, or more in compass then the earth.

To this I answer, That when Astronomers speak of this vast magnitude of the sun, they meane the cubical Magnitude thereof; for the sun being a round solid Globe, as the earth

earth, if you will know the true proportion between the one and the other, you must reckon it according to the cubes of their diameters, and not by their diameters simply considered. Thus suppose a Cube of any quantity great or small if this cube were increased to be as big again every way, it will not only be 2 times, but 8 times as much. Thus a piece of timber, being one foot square every way, is one foot; but a piece of timber 2 foot square every way, is 8 foot, and may be cut into 8 single feet, each whereof shall be a foot square. And if the piece of timber be 3 foot square every way, it contains 27 such single feet; if it be 4 foot square, it contains 64 feet; if 5 foot square, 125 feet; and if it be 6 foot square, it contains 216 feet, &c. according to their cubes. The like proportion there is also in round bodies or bullets, though they cannot be sensibly divided, yet you may try it by their weights; for these solid bodies being of the same substance, hold the like cubical proportion, both in weight and measure: Thus an iron bullet of two inches diameter, weighs one pound and half a quarter, but an iron bullet of whose diameter is 4 inches, which is double to the former, will weigh 9 pounds, which is 8 times as much. And so let their diameters be more or less their weight will be in proportion to the cubes thereof.

And thus the diameter or whole breadth of the sun being 38400 miles, and the diameter of the earth being 6873, the one being contained in other 5 times and an half, the cube whereof being 166, shews that the sun is full 166 bigger then the earth, according to *Ptolomy* and the ancient Astronomers account. And so the diameter of the moon 1920 miles, being above 3 times and an half less then the earth, shews the moon to be less then the earth 46 times; likewise the diameter of the moon being 20 times less then the sun, shews the sun is bigger then the moon 8000 times.

And thus you see by degrees, how these things come to be found out; and though to those who have no skil in these Arts, they may seem strange, and they cannot imagine how it should be known, that the sun should be 166 times bigger then the earth, yet the thing may in a good sort be demon-

demonstrated. Now that this magnitude is the least that can be, you may see by the several computations of the greater part of Astronomers. For *Tycho Brahe* makes the sun 140 times bigger then the earth, *Copernicus* makes it 162 times, *Longomontanus* and *Argol* make it 196 times. And though all Astronomers do not exactly agree in this magnitude, yet they agree in their demonstrations thereof; only some supposing the sun farther from the earth, make the sun so much the bigger. Thus *Bullialdus* makes the sun to be 1460 semidiameters from the earth, by which the sun will be 7 times broader then the earth, and so his Cube will be 343 times bigger then the earth. *Lansbergius* placeth the sun a little farther, *viz.* 1500 semidiameters; and so the sun should be 7 times and an half, and somewhat more, broader then the earth and his cube 434 bigger then the earth. But *Kepler*, though an excellent Astronomer, and the chief maintainer of the Copernican System, doth too far exceed all others herein, making the distance of the sun 3469 semidiameters of the earth, and the magnitude of the sun likewise 3469 times greater then the earth, which is ten times greater then *Bullialdus*, and 20 times greater then most other Astronomers. I shall not stretch your credulity to too great an extent, only hereby you may see that the magnitude of the sun cannot be less then 150 or 160 times bigger then the earth, which is that I undertook to prove, and which I hope I have plainly demonstrated unto you.

As for the distances of the other Planets, these are easie to be found if once the distance betweene the sun and the earth be determined; for they moving (without all question regularly) about the sun, and yet seeming to us to move sometimes forward, and sometimes back ward, this angle of their retrogradation shewes their distance from the sun, being nothing else but their *Parallax* or diversity of appearance, at their proper center, and at our place of observation, the earth. But this is the most difficult point in the Art of Astronomy to determine the true distance of the sun from the earth: and therefore some later Astronomers do not reckon these distances in semidiameters of the earth, but they take

take the whole distance between the sun and us, which is the semid. of the suns orb (let that distance be what it will, being not certainly known) & make that the measure of these distances, dividing it for better distinction, into 100000 parts, and so assign out the distances of the planets from the sun in these more certain parts of the suns Orb.

Thus according to *Bullialdus* Saturn is distant from the sun 9,52500 such like parts of the suns orb, that is 9 times and an half and somewhat more, farther from us then the sun. Jupiter is 5,22000 such like parts distant from the sun, that is, above 5 times farther from us then the sun. Mars is 1,52200 such parts distant from the sun, and so much likewise from us; for the distances of these 3 planets from the sun, is all one with their middle distance from the earth But Venus is but 72304 such parts distant from the sun, & Mercury is but 38240 such parts distant from the sun, yet because they move round about the sun, therefore their distance from the earth is the ful orb of the sun 100000 parts.

Having thus the distances of the planets, their several magnitudes are found by their apparent diameters. But it is found by observation with prospective Glasses, that these stars seem (and therefore were formerly accounted) to be much bigger then they are; their glimering light being much increased by the Aire and vapors therein. I shal not therefore strive to magnifie them more then needs; they being big enough according to the least proportion allowed them. *Bullialdus* observes the visible semid. of ♄ to be 32 seconds, of ♃ 57 sec. of ♂ 25 sec. of ♀ 48 sec. of ☿ 29 sec. According to which the true semid. of the planets, or their simple proportion to each other, and their cubical proportion to the earth, will be as in this Table;

	Their dist. from the Earth and Sun in 100000 of the orb	The true semid. of the Plan. in 100000 parts of the suns orb	Their cubical proportion in respect of the Earth	Times.
Saturne	9,52500	147	Greater	9
Jupiter	5,22000	144	Greater	9
Mars	1,52200	018	Lesser	55
Sun	1,00000	478	Greater	343
Venus	0,72304	023	Lesser	26
Mercury	0,38240	014	Lesser	117
Moon	0,04047	019	Lesser	46
Earth		068		

As

As for the compass of any of these Heavens or Planets; you must first double these numbers of their distances, and so you have the Diameter, or whole breadth of their Orbs, then work according to the usual proportion, as 7 to 22, so their diameter to their circumference. And if you have a mind any time to reduce these parts into miles, you see that for the semidiameters of the earth there is allowed 68 parts and an half: Now the semidiameter of the earth being, as I shewed before 3416 miles, being divided by 68 and an half, shewes that each of these parts comes to about 50 Miles. And now by this Table taking out with a pair of Compasses these distances of the planets, and their semidiameters, you may describe them in paper, and so see the true form of the heavens, and the quantity of these bodies one in respect of another, and conceive thereof much more plainly.

I come now to the most difficult point of Astronomy, to speak somewhat of the vast distance and magnitude of the fixed stars. All agree that they are further distant from us then the planets, but how is very hard to determine. If according to Tycho we shall allow to be only 1600 semidiameters farther then Saturn this will be too neer, and will bear no proportion to the distances of the planets from each other. Clavius following Ptolomeus and Alphagranus makes the lower part of the starry heaven to be 22612 semidiameters from the earth; but the upper part to be just as much more, 45225, in the midst whereof you may suppose the stars to be placed about 33 or 34000 semidiameters from us. And though there be no such reason for the thickness of this heaven, as there might seem in that hypothesis for the thickness of the other Orbes; yet considering the great distance that is between the other Orbs, Jupiter being three times further then Mars, and Saturn twice as far as Jupiter; this starry heaven may very well be as far again as Saturn; So that Saturn being ten times farther then the sun, the stars may be twenty times farther then the sun, which will amount to neer 30000 semidiameters of the earth; which is somewhat nigh the account of Alphagranus.

Now

Now according to this distance, and the visible diameter allowed to the stars by him, the proportion of the stars to the earth, are thus,

The magnitude or orbs of Stars,	The stars broader then the earth	The stars bigger then the earth	The diameters of the stars lessned their proportion to the earth, is.
1	4 times 75 parts	107 times	13
2	4 48	90	11
3	4 17	72	9
4	3 80	55	7
5	3 30	36	4
6	2 62	18	2

But the visible Diameter of the stars is found to be much increased by the vapours of the Air; so that through a good Prospective glass they appear scarce half so broad; therefore their bigness will be much less. By this account the greatest stars will be but 107 times bigger than the earth, and the rest according to their proportion as in the Table.

And if this being the least distance and proportion of the stars that can be, be so great & wonderful, so that few or none will give credit thereunto; then what shall we say to the Copernicans, who infinitely extend the distance beyond all sense and reason. Indeed Copernicus himself passeth this over as slightly as he can, only saying, the stars must be so far distant from the earth, that not only the earth, but the great Orb of the earths or suns motion must be as a little insensible point compared thereunto. And so indeed it must needs be or else his supposition of the motion of the earth about the sun cannot be true. But it much troubles his followers to make this vast distance any thing probable. Keppler would insinuate, that as Saturn the highest of the Planets is 1000 semidiameters off the sun distant from us; so the fixed stars should be 1000 times further from us then the sphere of Saturn is, and as if this were not far enough, Lansbergius makes the distance of the stars 28000 semidiameters of the suns orb, which is 800 times further then Saturn. But besides the unlikelihood of such a vast needless distance, see the disproportions which follow hereupon. For upon this account Lansbergius going to calculate the magnitude of the stars, he finds that the stars of the first magnitude exceed (not only the earth or the sun, but) the great orb wherein the sun

sun moves, 20053 times, and the other stars, according to their proportion. But I shal not take advantage of his mistake in this computation being acknowledged and corrected by him. But for all that though he lessneth the visible diameters of the stars as he pleaseth yet by his corrected account, the stars of the first magnitude wil exceed the Orb of the sun 67 times. Now the semidiameters of this Orb of the sun, he makes 1500 semidiameters of the earth, which cube shews it contains the earth 3,735,000,000 times; and the stars being greater 67 times must needs be 226.125.000.000 times greater then the earth a number which exceeds the account but much more the belief of an ordinary Arithmetician. By this account one of these stars should be as big almost as the whole heavens, with al the stars and planets therein, according to Tycho. But these things seem so unlikely even to their own sect, that Martinus Hortensius his scholar and coadjutor in these studies, doth what he can to salve this; and to this purpose, first he lessens the distance of the stars from 28000. to 6875 semidiameters of the suns orb, supposing the Parallax thereof may be half a minute, and yet not perceivable. This is indeed as neer as he can draw the compass of the stars, without overthrowing his hypothesis. For if the Parallax hereof had been but half a minute, they would scarce have scaped the curious observations of Tycho. But he is somewhat more bold in lessning the apparent diameters of the fixed stars, making the biggest thereof but 8 or 10 seconds, whereas they have been accounted by others to be two minutes or 120 seconds. And yet for all this diminution, both of their distance, and their diameters, yet one of the stars of the first magnitude according to his account is above 17 millions of times bigger then the Earth. Nay for all this extenuation, if the followers of this opinion will allow of Keppers distance of the sun. (as some of them are ready to do, and allow the sun scarce one minute Parallax) making his distance 3469 semidiameters of the earth then the magnitude of these stars will be 12 times more, and so one star wil be above two hundred millions of times bigger then the earth.

By this you may see the improbability of this Hypothesis the followers whereof have no other reason to pretend for the

this vast distance, but only the slow motion of the stars, whi
make their revolution in 25000 years; and therefore they shou
be so many times further from us then the sun, who makes his r
volution in one year. But to this I answer

If there were any likelihood or proportion in this, then by th
same rule, Jupiter who is twelve years in finishing his course
should be twelve times further from us then the sun; whereas h
is certainly knowna to be but little more then 5 times further then
the sun. And so Saturn who is 30 years in finishing his revolution
should be by this rule 30 times farther then the sun, whereas he
is but ten times farther. And if you work by either of these pro-
portions, you will find the distance of the stars much less then ei-
ther Keppler or Lansbergius makes it.

But Keppler himself hath a much more probable supposition
concerning this, if he would have made use of it observing that
there is a sesquialtera proportion between the distances of the
Planets, and the times of their revolution, which he thus explains.
The time of Jupiters revolution is 12 years, the Cube root of it
is 2, 29 parts, which squared is 5, 2441 parts, which is very nigh
the distance of Jupiter, that being in the Table 5 tines, and 2208
parts further then the sun. The like falls out in the other Planets.
And if he had applied this to the stars, the time of their revolu-
on being 25000 years, the Cube root thereof is 29 325 parts, which
squared is 855; 5625 parts. So that the distance of the stars by this
rule should be but 858 times further from us, not the thirtieth
part of what Lansbergius or he make it. But sure Keppler was a-
fraid to apply this proportion to the stars, lest it should overthrow
his hypothesis of the earths motion, as indeed it will. For though we
should grant the stars had this vast distance, yet for all this they
would be subject to 4 minutes Parallax, which would easily have
been perceived by curious Artists. But no such Parallax being ever
observed, there is no likelihood of any such motion; and less
reason have they to extend this distance so much further.

The conclude, The Copernicans make the incredible swiftness
of the daily motion of the stary heaven, to be one of their chief
arguments against the old Astronomers. But though we allow,
according to them, that the stars are 30000 semidiameters of the
earth, distant from us, yet the compass of this heaven, will be but
3:000 times the compass of the earth. And I appeal to all men
which is most likely, either that the starry heaven should move
this compass once in a day, or 24 hours; or that one of the stars
should be according to Lansbergius account, 226, 125, 000, 000
times bigger then the earth; yea, or that one star, according to the
diminished account of Hortensius, should be 17 million of times
bigger then the earth. And therefore let them mention this Ar-
gument no more, but let this rather convince them of the absur-
dity of their hypothesis in this particular.

FINIS.